THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR STEEL TREATING

Volume IV | Entered as Second Class Matter, July 26, 1930 at the Post Office at Cleveland, O., under the Act of March 3, 1879 | June, 1932 | No. 6

67

THE JOHN CRER 1932 BRARY

SEE GIANT TEST BAR PULLED BY MACHINE

Gate Men See 4,000,000 Lb. Testing Machine Operate

By Howard S. Taylor

Over 200 members and guests of Golden Gate chapter met at the University of California on May 16. The main attraction was the operation of the four million pound testing machine recently installed in the new engineering materials laboratory.

After a few words of welcome by Dean Charles Derleth, Jr., of the College of Engineering, Professor G. E. Troxell explained the construction and operation of the huge testing machine and spoke of the test work being conducted by the laboratory in connection with the Hoover Dam and the projected bridge across San Francisco Bay. The meeting then adjourned for a tour of the testing laboratory and the College of Mechanics.

The new engineering materials laboratory is equipped for testing all kinds of engineering materials. Most of the building is equipped for cement and concrete testing. The large calorimiter room is a room within a room and is designed to measure the amount of heat liberated by concrete as it sets and ages. This test is of extreme importance since, in pouring large masses of concrete as will be the case in building the Hoover Dam, the expansion due to the heat generated in the concrete necessitates serious consideration.

The projected bridging of San Francisco Bay presents a number of problems that are being solved by the study of scale models of proposed bridge designs. Measurements of stress and deflection on the models check within 0.5% the figures obtained by laboriously applying the complex formulae to the actual bridge dimensions.

Opportunity was given the assemblage to inspect the College of Mechanics laboratory where Professors C. W. Horack and N. F. Ward explained their work in metallography and heat treatment.

Interest was then centered around the large testing machine where preparations had been made to pull a seven foot bar of S.A.E. 1020 that was 6¼ in. in diameter. The complete analysis of the bar had been given the members as well as the Brinell hardness and several groups had formed pools in which estimates of the tensile strength of the bar had been made. As the test progressed, the load readings were announced and spirited betting continued as the bar was seen to elongate.

The final breaking strength was 1,810,000 lb. and the bar necked down and fractured in a perfect cup and cone. When the break occurred the resulting concussion was like the bursting of a high explosive shell and the upper portion of the bar jumped upward a distance of about two feet where it was held from falling out of the machine by a chain that had been previously attached to its end.

This demonstration ended the program of the evening and it was the universal opinion that this meeting had been one of the most enjoyable and instructive in the history of the chapter.

METALLIC COATINGS ON STEEL EXPLAINED TO INDIANAPOLIS

E. J. P. Fisher Delivers Talk

By A. E. Focke

The last technical meeting and annual election of officers of the Indianapolis chapter was held at the Severin Inn on April 4.

E. J. P. Fisher, metallurgist of the Keystone Steel and Wire Co., delivered the principal talk on "Metallic Coatings for Iron and Steel."

Mr. Fisher was formerly chairman of this section, and the chapter was glad to welcome him again.

He developed his talk around the electrolytic theory of corrosion and showed why zinc holds its important position in the field of metallic coatings.

He then showed interesting examples of the effect of heat treatment of the zinc coating to improve its resistance to corrosion.

Explains Popularity of Chapter Meetings

The following paragraph is from a letter written by a member of the Society to the retiring chairman of his chapter. Clearly and briefly it expresses the reasons why A.S.S.T. chapter meetings are so well attended.

"The pleasure a member gets from attending a meeting is not confined to the knowledge gained from the speaker's talk. It is in the chats with friends, the exchange of ideas and information upon subjects in which we are individually interested, the joking and fun that goes on."

V. N. KRIVOBOK TALKS AT CHICAGO MAY 12

Chapter Visits Plant, Learns Of Investigation Of Metals

By A. W. Sikes

The Chicago chapter's annual inspection trip was made this year at the Hawthorne Works of Western Electric Co., Illinois' largest manufacturing institution, on May 12. One hundred ninety-four members of the Society arrived at the plant at about 2 P. M. and were conducted through various metallurgical operations in groups of 8 to 10, each in charge of a guide who was also a member of the chapter.

The inspection trip was followed by a dinner meeting at the City Club, attended by approximately 175 members of the Society, at which Professor V. N. Krivobok, research associate, Bureau of Metallurgical Research and professor of metallurgy, Carnegie Institute of Technology, gave the principal talk covering "Methods of Metallurgical Investigation and the Results to be Expected Therefrom." Some 75 additional members came in later to listen to the talk of the evening.

Professor Krivobok was introduced by A. W. Sikes of Western Electric Co., who made arrangements for the inspection trip in the afternoon and who was technical chairman during the evening meeting. Professor Krivobok gave the four major methods of investigation resorted to in metallurgical laboratories during the course of investigations of material. These methods are as follows:

Chemical, including a discussion of the effect of furnace atmosphere on creep tests; hydrogen annealing; spectroscopic analysis; and gas analysis for occluded or dissolved gases.

Microscopic methods were divided up into trouble shooting, inspection laboratory methods and research types of investigation. We were informed by the speaker that the Metropolitan Museum in New York City retains a consulting metallurgist to pass on the authenticity of medieval armour, weapons, and other metallurgical articles of historic interest. The value of the microscope to such modern activities as scientific crime detection was also discussed. High temperature etching and photographic work were discussed, and Professor Krivobok predicted that this tool would be of increasing importance in the study of alloys undergoing allotropic modifications at elevated temperatures.

The third major classification was given as "Critical Point Determinations." These may be divided into two major sub-groups, the first designated thermal methods and the second volume contraction methods. By the very ingenious use of a galvanometer in connection with a photoelectric cell, Dr. Krivobok has been able to take automatic records of critical points of various metals and alloys. In addition, the dilatometer has been used to measure the slope of expansion and contraction curves of various alloys under test as any change in the slope of expansion curves with heat indicates a phase change in the material under

Continued on Page Three

INDEX TO "TRANSACTIONS"

An index of the technical papers printed in Vol. XIX of *Transactions* has been prepared and is available to members on request to National Headquarters. Vol. XIX includes the issues from November, 1931 through June, 1932.

THREE INTERESTING PICTURES MADE AVAILABLE TO CHAPTERS

Copper, Brass And Razors Filmed

Description of three very interesting industrial motion pictures were received too late at national headquarters to be included in the 1932-33 Speakers' Directory.

American Brass Co., Waterbury, Conn., offers "From Mine to Consumer —The Story of Anaconda," a two reel film in 35 mm. or 16 mm. widths, and "Manufacture of Anaconda Sheet Copper," two reels in the 35 mm. size or one reel of 16 mm. width. Both are available to chapters at no charge except for transportation. The films are not inflammable.

Heppenstall Co., Pittsburgh, has available a film showing the manufacture of fine safety razor blades. This film comes only in the larger size and requires about 15 minutes for projection.

Communications about the Anaconda films should be addressed to the attention of A. R. Stocking, sales department, American Brass Co., Waterbury, J. A. Succop, research engineer of Heppenstall Co., Hatfield St., Pittsburgh, will be able to give further information on the razor blade film.

McQUAID TELLS N. Y. OF CASE HARDENING

Lists Recent Developments In Practice Of Carburizing

By F. H. Clark

The New York chapter held its monthly meeting on May 9. Dinner was served at Loft's restaurant and the meeting held afterwards at the Woolworth Building.

H. W. McQuaid, metallurgist of the Timken-Detroit Axle Co., Detroit, spoke on "Case Hardening and All That Goes With It." The speaker said that normal steels showed a carbide network at the grain boundaries whereas abnormal steels showed thickened gain boundaries and a tendency to resolve into two constituents, carbide and ferrite. Neither extreme is desirable. Normal steels are deep hardening and coarse grained; abnormal steels are shallow hardening and fine grained. Soft spots often occur in the surface of case hardened abnormal steels, and it is for this reason that a study of them is so important.

Mr. McQuaid said that there are two schools of gear manufacturers: those that believe in using a carburized steel and those that believe in the medium carbon steel. Both types of material have their applications.

One of the important factors in the service of gears today is the skin operating temperature which for heavy work may run as high as 500-600° F. This may cause softening of the contact surface with a subsequent change in tooth contour. Breakage of teeth inevitably follows.

According to Mr. McQuaid, dynamometer tests on gears have shown that if lubrication, rigidity of mounting and depth of case are the same, then the actual steel used is relatively unimportant. Gear wear has been greatly reduced by the use of sulphurized lard oil for heat treatment. At the present time, dynamometer tests on gears have given the best results with the use of a Cr-Ni-Mo steel with 0.35-0.40 carbon and a hardness of C-53. This steel was not carburized.

Mr. McQuaid said that for carburized gears we used to think that a 5% Ni steel was best and that S.A.E. 2315 was next best, but he now believes that a 3½% nickel steel containing molybdenum is better where the operating skin temperature is high. The most important factor, however, is the relation of case depth and hardness to the core hardness.

There are other materials better than case carburized steels for resisting wear. Mr. McQuaid advises chilled cast iron heads for a valve tappet which is the member conveying the movement of a cam to the valve stem. Chilled cast iron is satisfactory where the load is light and the sliding friction great.

A prolonged discussion following the meeting was evidence that Mr. McQuaid's talk was greatly appreciated.

FEWER PAPERS FOR EACH METAL CONGRESS SESSION ALLOW MORE TIME FOR DISCUSSION

Publication Committee Schedules Not More Than Three Papers To A Session; Show Space Sales Increase

Ample time for discussion of technical papers seems assured at the forthcoming National Metal Congress to be held in Buffalo the week of Oct. 3. Not more than three papers have been scheduled for any one of the nine A.S.S.T. sessions, in response to popular demand for more time for written and oral discussion at meetings.

The list below contains the titles of the papers tentatively scheduled for presentation at the Congress. Both the subjects and titles are subject to change. Announcements will be mailed later to members listing available preprints and giving instructions for ordering.

Reservations for exhibit space in the National Metal Exposition, which will be held at Buffalo's 174th Regiment Armory, are steadily increasing. Over 90 companies have made space reservations. A large, attractive show is sure.

The following is a list of approximate titles of A.S.S.T. papers to be delivered at the Congress:

Experiments on Steel Forgeability
A Simple Cutting Tool for Measuring Pressures in the Direction of Cut
Scaling of Steel
Transformation in the Carbide Phase During Graphitization
New Developments in Nitriding
Creep Characteristics of Metals at Elevated Temperatures
Effect of Sulphur Gases on Scaling Steel in the Forging Range
Drop Forging Practice
Forging Furnaces and the General Problem of Heating Forging Steel
Development and Application of Deep Etching
Preparation of Specimens for Deep Etching, Etching Reagents, Time and Temperature of Etching
Interpretation of Structures as Revealed by Deep Etching
Deep Etching as an Inspection Method in a Steel Mill
Critical Ranges of Iron-Carbon Alloys
Field Search for Age Hardening Alloys
Inspection and Testing of Sheet Steel
Lubrication of Deep Drawn Sheet Metal Parts
Annealing of Cold Rolled Strip Steel
Internal Friction as a Physical Test for Metals
Hardening Transformation in Fe-Mn-C Alloys
Effect of Normalizing Medium Manganese Steels on the Microstructure and Physical Properties
Tungsten-Cobalt System
Effect of Gas in the Hardening of High Speed Steel
Molybdenum High Speed Steels
Corrosion Resistance of Chromium-Iron Alloys in Various Media
Design of the Heat Resisting Alloy Furnace Parts and Their Performance in the Field
Manufacture of Stainless Alloys

NEW HAVEN HEARS TALK ON LIGHT ALLOYS ON APRIL 21

E. H. Dix, Jr., Is Speaker

The April meeting of the New Haven chapter was held in Waterbury, on April 21. The subject for the evening, "New Developments in Light Alloys," was very fitting for this non-ferrous community. E. H. Dix, Jr., chief metallurgist of the Aluminum Co. of America's research laboratories, was the principal speaker.

Mr. Dix gave a brief review of the early history of the developments of aluminum and magnesium alloys and devoted some time to the characteristics of the important commercial aluminum alloys. The new developments in the field of alloys, commercial applications and the future of these materials was discussed.

A very interesting discussion followed this informative talk.

The meeting was preceded by a dinner at the Waterbury Club. J. A. Jackle, works manager of Chase Companies, gave the coffee talk.

Approximately 80 men attended the meeting.

TRI-CITY MEN HEAR TALK ON FURNACES AND FUELS MAY 3

1931-32 Season Successful

By R. H. Lind

About 45 members and friends of the Tri-City chapter met at the Blackhawk Hotel, Davenport, on May 3 for the final meeting of the year.

C. E. Martin of Holcroft & Co., Detroit, delivered an interesting and valuable paper on heat treating furnaces and fuels. He described in detail the many types of furnaces in use and the application of fuels to each. Points were stressed that make it possible for a manufacturer to quite definitely determine the type of furnace desired before calling in a furnace specialist for details. This he stated, has a tendency to eliminate much lost time and effort in securing the proper equipment.

Capt. J. W. Slattery of the Rock Island Arsenal and a member of the local chapter gave a brief, interesting talk on "Modern Developments in Wartime Equipment."

This meeting marked the close of a successful year filled with many interesting and educational talks on the always important and ever advancing problems and science in modern steel treating practices. Mr. McGee, the retiring chairman is largely responsible for bringing before the Tri-City group capable and learned men on many of the newer developments pertaining to strength, durability, and application of steel along with modern shop practices.

The splendid attendance and interest shown throughout the year is just proof of the value and appreciation of Mr. McGee's splendid leadership.

NO "REVIEW" FOR 2 MONTHS

The REVIEW will not be published during July and August owing to the cessation of chapter activities. The September issue will contain complete information on the Fourteen Annual National Metal Congress and Exposition.

MONTREAL ENDS SEASON WITH BUSINESS AND ENTERTAINMENT

Over 250 Attend May 14 Meeting

The Montreal chapter held its annual meeting on May 14 in the Windsor Hotel in Montreal. At this time officers and executive committee members were elected to serve for the 1932-33 season.

In the business meeting short addresses were heard from C. F. Pascoe, national director; P. H. Desrosiers, speaking in French; Don Fraser, past chairman of Ontario chapter; C. E. Herd and D. MacInnes. R. J. Noakes presided over the meeting.

In his speech Mr. Herd, the newly elected chairman, pointed out that great progress had been made in the chapter during the past year, and hoped that it would be continued during the year to come. He emphasized the need for every member to work for the chapter, as publicity was the life blood of the organization.

Mr. Pascoe urged the members to try hard to attend the Buffalo Convention.

More than 250 attended the meeting. The celebrated Steel Treaters Review, managed by Mr. Durkin and Mr. Norton was well received.

THE REVIEW

Devoted to the interests of the American Society for Steel Treating

A Review of the Activities of the Chapters and National Organization of the A. S. S. T.

Published monthly except July and August by the
AMERICAN SOCIETY *for* STEEL TREATING
7016 Euclid Ave., Cleveland, O.

A. H. D'ARCAMBAL, *President*
A. T. CLARAGE, *Treasurer*
J. M. WATSON, *Director*
B. F. SHEPHERD, *Director*

W. B. COLEMAN, *Vice-President*
W. H. EISENMAN, *Secretary*
F. B. DRAKE, *Director*
H. D. MCKINNEY, *Director*

C. F. PASCOE, *Director*

Subscription $.50 a year; 5 cents a copy

RAY T. BAYLESS ..... *Editor*
JOHN G. MAPES ..... *Managing Editor*

Volume IV Cleveland, O., June, 1932 No. 6

MAY 11 GATHERING IS "YORK'S OWN"

Bennett Is Technical Speaker; Chapter Committees Report

By A. W. F. Green

The May 11 meeting of the York chapter was held in York in the rooms of the Engineering Society and constituted the final meeting for the 1931-32 season. Following a plan which was inaugurated at the annual meeting of the 1930-31 season, the speaker was obtained from the list of the chapter itself. The annual meeting has been called "York's Own."

Fifty-five members and guests were present when the meeting was called to order by Chairman George J. O'Neill. The chairman, after brief remarks in which he thanked the several operating committees of the chapter for their cooperation during the past year and the executive committee for their earnest support, requested the annual reports of the several committees.

Arthur W. F. Green, Chairman of the Entertainment Committee, outlined the program that had been held during the year. Following Mr. Green's report a motion was made and seconded, accepting same and thanking him for his services.

S. D. Armer, of Lancaster, then presented the report of the Membership Committee of which he was the chairman. A motion was made and seconded, thanking Mr. Armer for his cooperation.

C. M. Strickler, secretary-treasurer of the chapter, then presented his annual report. This disclosed that the chapter has come through the 1931-32 season without any deficit and with a substantial balance in its treasury.

W. C. Bullette voiced the unanimous opinion of appreciation of the membership of the chapter when he outlined the activities and work in the formulation and carrying on of the chapter in behalf of George J. O'Neill, the retiring chairman. At the conclusion of his remarks a rising vote of acclamation was given to Mr. O'Neill for his unselfish and untiring efforts.

The speaker of the evening, John C. Bennett, metallurgist of the York Ice Machinery Corp., was then introduced. Mr. Bennett chose for his subject "The Manufacture of Cast and Malleable Iron in the Indirect Arc Furnace." His talk, illustrated by lantern slides and numerous types of castings, was an outstanding presentation in the annals of this young chapter. Numerous and highly complimentary remarks followed the presentation of his paper and a lengthy discussion ensued.

The York chapter again demonstrated its ability to present a program built up entirely within its own membership, that was so favorably received.

HOMERBERG AND B. F. SHEPHERD SPEAKERS

Boston Concludes Fine Season With Successful Meeting

By Howard E. Handy

The annual meeting of the Boston chapter, held May 6, at Massachusetts Institute of Technology, was preceded by a dinner given in honor of B. F. Shepherd, national director of the A.S.S.T. and chief metallurgist, Ingersoll Rand Co., and of Dr. V. O. Homerberg, associate professor of physical metallurgy at M.I.T. and director of the Nitralloy Institute, New York. The attendance at dinner was about 50 and at the evening meeting about 150.

Immediately following dinner the annual report of the Boston chapter was read by the secretary-treasurer and officers were then elected for the year 1932-1933.

Dr. Homerberg gave a 20-minute coffee talk on the "Progress in Nitriding" during the past year. For several years he has given a similar talk at the annual meeting in May and this time he made particular reference to the part which nitriding is playing in the casting industry, including malleable, steel and gray iron. The advance information which Dr. Homerberg periodically deals out to the Boston chapter is much appreciated by the members.

Mr. Shepherd's talk was entitled "Tool Steel Personality." He stated that the production of high-quality parts of tool steel requires accurate control of those factors affecting the uniformity of the finished product. The last word in hardening equipment, pyrometers, quenching sprays, etc., is used and the steel purchased to exacting specifications.

"Unfortunately," continued the speaker, "steel may have a chemical composition entirely within a specification and yet be entirely unsuited for a specific purpose."

The inherent property of tool steels, cast in similar types of molds and having their chemical analysis within close limits, to possess a different degree of hardness penetration and width of allowable quenching range, was designated by Mr. Shepherd as "Personality" or "Timbre." With the aid of a large number of slides he then proceded to show some hardening irregularities in tool steel, the effect of "Personality" upon service life, and the results which have been obtained on the products of his company in controlling his so-called "Personality" by purchasing material from accepted sources of supply.

C. F. Bonnet is now located in Philadelphia as representative of the U. S. Chromium Corporation.

RHODE ISLAND MEN ADDRESSED BY TOUR

Learn to Distinguish Types of Furnace Atmospheres

By Stuart A. Woodruff

The Rhode Island chapter met on April 22, at the rooms of the Providence Engineering Society. The speaker of the evening was Sam Tour, vice-president of Lucius Pitkin, Inc., New York. His subject was "Furnace Atmospheres."

Mr. Tour pointed out that the atmosphere in an ordinary furnace is composed of seven distinct elements as follows: Hydrogen, oxygen, nitrogen, carbon monoxide, carbon dioxide, methane and water vapor. The nitrogen is inert and does not react. Oxidizing, neutral, and reducing atmospheres are commonly considered to be simply a function of the oxygen present. In other words, the common conception of an oxygen atmosphere is one that has excess oxygen as indicated by the presence of flame, etc. The speaker then showed that any particular atmosphere could not be definitely called oxidizing or reducing because an atmosphere which is oxidizing for one type of steel might be reducing for some other type of steel.

The nature of hydrogen, oxygen and carbon at furnace temperatures was emphasized. These elements are in the nascent or atomic condition at elevated temperatures and are much more active than at room temperatures. The effect of very minute quantities of water vapor was described. Dry hydrogen will not decarburize steel until a temperature of 1600/1700° F. is reached; with 0.1% water vapor it will decarburize steel at 1200° F.

Mr. Tour defined a neutral atmosphere as one which will not scale, carburize, or decarburize the particular piece of steel being heat treated. Tool steel requires an excess of oxygen if the atmosphere is to be truly neutral. At 1600° F., 4% excess is required; at 1700° F., 2% is needed.

N. J. SUSTAINING MEMBERS HONORED

Five National Officers Present At Annual Dinner On May 2

By J. Sammon

The New Jersey chapter concluded the 1931-1932 series of meetings on the evening of May 2, with the annual dinner and entertainment given in honor of the sustaining members.

F. A. Ellshoff, chairman of the entertainment committee, arranged an excellent program of talking moving pictures together with a number of the national officers of the Society as guests, each being called upon by Mr. Ellshoff, as toast-master, to give a short talk.

Mr. Ellshoff thanked the sustaining members for the support they have given our chapter and then introduced A. H. d'Arcambal, president of the society who congratulated the chapter on its membership standing. We then heard a few remarks by Vice-President W. B. Coleman after which Secretary "Bill" Eisenman as a smiling agent sold everyone on the idea of exhibiting this year at Buffalo. We also had a few remarks from Directors B. F. Shepherd and H. D. McKinney, thus making quite a representation of our national officers at this dinner.

Toastmaster Ellshoff introduced the speaker of the evening Dr. Samuel W. Grafflin, philospher, humorist and editor of *The American Aristocrat* whose subject was "Staging a Come-back." Dr. Grafflin has a great personality and a unique manner of presentation. His talk had to do with the present depression and its cure and at times he minced no words.

"Industry never was in better shape than it is now," Dr. Grafflin asserted, "but business is bad. We do not need to do anything about improving industry; what we need is to find business. We are coming out of this mess—slowly, patiently and certainly. I personally have been through six such disturbances and I know that America always wins through."

The speaker issued a warning against increasing the bonded indebtedness of government.

"If we bond this country up to its eyes," he said, "to relieve the little pain we now suffer, twenty years from now some American Hitler will be telling our children they did not contract the debt and they won't have to pay it."

SCHENECTADY MEETS MAY 17

Holds Annual Meeting And Election; Hears Talk On Earthquakes

By Floyd C. Kelley

The Schenectady chapter held its annual meeting and election of officers on May 17, at the Hotel Mohawk. The speaker of the evening was Professor E. F. C. Smith of Union College who gave a very fine talk on Earthquakes.

The phenomena were illustrated by lantern slides showing the results produced in nature, and illustrations of the forces acting, and the wave motion produced in the earth's crust. Two-thirds of the membership turned out to hear the very entertaining talk given by Professor Smith.

NITRIDE TALK ENDS PHILADELPHIA YEAR

Air Conditions And A_3 Transformation Also Studied

By Adolph O. Schaefer

The last of the monthly technical meetings of Philadelphia chapter's season drew a record attendance; and testified to the popularity of Dr. V .O. Homerberg, and the interest in his subject—"Nitriding."

Even the dinner preceding the meeting was crowded, and extra tables had to be set up to accommodate the unexpected attendance. The identity of the coffee talker had been shrouded in mystery and was revealed as none other than Charles Russell, the well known chairman of the Entertainment Committee.

Mr. Russell's work has led him into the field of air conditioning, and it was of this he spoke. He predicted the building of the future saturated with filtered, sterilized, humidified air. People would go indoors to get a "breath of fresh air."

The economic side of the picture was not neglected. Some industries must have air conditioning because of the nature of the product, while all suffer losses from the common cold amongst employees. The talk ended with a description of the equipment in Philadelphia's newest office building, now under construction.

Dr. Homerberg's talk on "Nitriding" was so interesting and so practical that too much praise cannot be given it. He answered for us the questions that are most often put up to him. Thus his discussion included types of furnaces, materials for containers, the values of various methods of hardness testing, alloys for nitriding, etc. It would be impossible to abstract all the wealth of information that Dr. Homerberg can cram into a short talk.

The Harvard film of the "A-3 Transformation in Iron" was most interesting and spectacular, and brought out a great amount of discussion. It was after eleven o'clock before Dr. Boynton could ring down the curtain on one of the most spirited meetings we have ever had.

HIGH SPEED BEST DRAWN AT 1000° F

Ellis Tells Ontario Results Of Heat Treating Studies

By J. W. McBean

At the annual meeting of the Ontario chapter held in the Royal Connaught Hotel in Hamilton there were present about 120 people, most of whom had attended the dinner.

After dinner we were treated to some delightfull piano music by George E. Boyce of the Musical Arts College.

In the reports of officers the condition of the chapter was shown to be a very healthy one, including the financial condition.

Professor P. Sandiford in a humorous and instructive coffee talk referred to the various yardsticks which have been used for measuring intelligence, and explained the development and use of the modern intelligence tests.

The paper of the evening was given by one of the chapter members, O. W. Ellis of the Ontario Research Foundation, who took as his subject certain characteristics of high speed steel of the 18% tungsten, 4% chromium, 1% vanadium type. After referring to the important work of other metallurgists, the results of the recent work by Grossman and Bain, of that by J. V. Emmons and of some experiments at the Research Foundation were taken up.

In a series of experiments conducted by the Ontario Research Foundation eight different members of the chapter were requested to use their facilities to harden a number of specimens cut from a single bar, using the following procedure, heat slowly to 1350° F., transfer rapidly to the furnace at 2350° F., hold at 2350° F. for three minutes, quench in oil. The specimens which had previously been notched, were broken and given drawing treatments of one-half hour, one hour and two hours at 600, 700, 800, 900, 1000, 1100 and 1200° F. The hardness of the specimens as quenched and as drawn was obtained with a Vickers tester of the Brinell type using a diamond pyramid.

In spite of the variations in furnace equipment in measuring instruments, in oil temperatures, in procedure and personnel, the experiments gave very interesting results. The hardness shown after drawings to 1000° F. were not only the highest, but were remarkably near alike, while those at other drawing temperatures showed a tendency to scatter very considerably.

This would appear to indicate that the practice of drawing to 1000° F. not only gives the maximum secondary hardness but is likely to give the most consistent results with slight variations in procedure as found in commercial practice.

As usual after the paper an attendance prize was drawn for and the lucky person proved to be H. Thomasson of the Canadian Westinghouse Co. of Hamilton. The prize was donated on this occasion by the Norman Slater Co. of Hamilton.

$2 Binds Your

• TRANSACTIONS

Members who wish to preserve Vol. XIX of *Transactions* in bound form should send their copies to National Headquarters together with $2 which covers the cost of binding in blue cloth to match previous bound volumes.

If any member wants to keep his copies of the issues of Vol. XIX, Nov., 1931 through June, 1932, in loose form and yet have a bound volume for his library, a complete bound volume will be supplied for $5, postpaid.

Employment Service Bureau

Address answers care of A. S. S. T., 7016 Euclid Ave., Cleveland.

POSITIONS WANTED

METALLURGIST - CHEMIST: Sixteen years in chemical and metallurgical laboratories of large plants. Experienced in the finishing of metal parts. Familiar with ferrous and non-ferrous metallurgy. Address 6-5.

CORROSION EXPERT: Chemical engineer; over two years research experience in steel company, testing and developing corrosion resistant alloy steels. Over four years in corrosion field with background of electrochemistry, pickling, plating, nitriding, potential measurements, etc. Address 6-10.

METALLURGIST: Eleven years in production and application of alloy steels, particularly corrosion resistant steels. Experience derived both in this country and Europe with some of the most successful manufacturers. Has held executive positions. Has had excellent training in fabricating alloy steels. Excellent record and references. Address 6-15.

METALLURGIST: University graduate, married, 32. Six years experience in chemical analysis, metallography, physical testing, pyrometry, heat treating and plant operation. Can specify materials, supervise laboratory and heat treating department and conduct research. Address 6-20.

RESEARCH METALLURGIST: Also experienced as development engineer or teacher of metallurgy and metallography. Degrees of B.S.E., M.S.E., and Sc.D. from Michigan. Three years as research metallurgist in large laboratory; three years at university teaching metallography. Experience includes seven research papers published by A.S.S.T. Address 6-25.

METALLURGIST - SALESMAN: Graduate metallurgical engineer; four years as chemist and metallurgist in laboratory and plant. Nine years successful selling experience in a highly competitive business. References. Philadelphia vicinity preferred, but will go anywhere. Address 6-30.

METALLURGICAL ENGINEER: Graduate of Renssalaer Polytech. Married. Experienced in studying service failures and in testing. Familiar with microscopy and heat treatment. Excellent references. Address 6-35.

CHEMIST: Experience covers ten years as chemist and metallurgist, four with automobile companies and the last five as chief chemist of a large manufacturing concern. Address 6-40.

METALLURGIST: Recently head of chemical, metallurgical and inspection departments of large steel mill. Fifteen years experience in every phase of manufacture of both alloy and carbon steels. Address 6-45.

TOOL ROOM FOREMAN: Also experienced as head of heat treating department. Experience includes 18 years in tool room work and 6 years in charge of heat treat. Ohio preferred, but will go anywhere. Address 6-50.

METALLURGICAL ENGINEER: Familiar with melting alloy steels. Educated in England; 20 years operating experience in American mills. Address 6-55.

RESEARCH METALLURGIST: Graduate of University of Leeds. Two years experience in manufacture and research of electrolytic iron; six years as chemist in analytical laboratory of large corporation. Eastern location preferred. Address 6-60.

METALLURGIST: Recent experience covers alloy steels for oil refineries, including investigation of corrosion resistant welds. For 11 years head of laboratory for alloy steel manufacturer. Box 6-65.

TECHNICAL DIRECTOR: Metallurgist and chemist, long experience in supervision of melting operations and laboratories. Knows malleable, gray iron and brass melting in all types of furnaces. Experienced in manufacture of pipe fittings, valves, light hardware and in railroad car work. Versatile and diplomatic. Address 6-70.

MECHANICAL EXECUTIVE: Wants position where extended experience as a mechanical executive in design, foundry, testing and chemical departments may be of service. Address 6-75.

LOS ANGELES HEARS ALLOY STEELS TALK

J. H. Spade Describes Heat and Corrosion Resisting Alloys

By Richard S. Smith

A very large attendance was present at the May 12 meeting of the Los Angeles chapter to hear a paper on "Heat and Corrosion Resisting Alloys," presented by James H. Spade, manager of the local warehouse of Ludlum Steel Co., and also to learn the results of the recent election of officers, as the voting was done entirely by mail ballot.

W. A. DeRidder, retiring chairman, introduced the new officers and directors, and after summing up the chapter's activities for the past year, he turned the meeting over to the new chairman, Thomas S. Hutton, who, in turn, introduced the speaker.

Mr. Spade presented a very interesting paper, which opened with a discussion relating to the three common classes of stainless irons, generally classified by the predominating constituent, namely, pearlitic, ferritic and austenitic, and discussing the principal characteristics including the heat treating characteristics of the pearlitic group, and the absence of the heat treating characteristics of the ferritic, and the solution heat treatment characteristics of the austenitic group.

The solubility of carbon in the ferritic and austenitic materials especially was described showing how small was the actual capacity of these materials to dissolve carbon as compared to carbon steels. It was stated that the austenitic (18-8) had an approximate carbon solubility of 0.35% at fusion temperature which was reduced to approximately 0.25% at the 2000° range, and was further reduced to approximately 0.06% at normal temperatures. Also that the ferrite material had a carbon solubility of a maximum 0.12%.

Some of the characteristics of the stainless materials under stress at elevated temperatures were discussed, showing that in the higher ranges the materials respond in plastic flow, some of the elements affecting plastic flow were mentioned, including grain size and shape, also internal friction and the effect of speed of the application of stress.

Slides served to improve the mental picture of the various characteristics.

CHICAGO CHAPTER'S MEETING

Continued from Page One

test. This method has been used to detect a new phase designated "epsilon" in iron-manganese alloys.

The fourth major group was designated as "Physical and Mechanical Testing" and the various well known types of test under this heading were not discussed as they were familiar to most of those present.

At the business meeting immediately following the entertainment, nominations for the year 1932-33 were presented to the chapter. The task of the committee was made doubly hard this year by the fact that Harry Hardwicke, vice-chairman of the chapter, declined for good reasons to permit his name to be presented to the chapter for the office of chairman. Mr. Hardwicke's long continued service to the chapter and to the national organization entitled his wishes to respect, and we, therefore, regretfully omitted his name from the list of proposed officers. The nominating committee was composed of Messsrs. Havens, Stevens and Knowlton.

Mr. Comstock, the secretary-treasurer, read the annual report showing the chapter's assets to be well over the $1000 mark and the chapter's membership to be over 400, which indicates a very favorable position for the organization in view of present conditions. At the close of his report, Mr. Comstock gave a very touching talk in appreciation of Mr. Colwell's services to the chapter during the six years the retiring chairman has been a chapter officer. The speaker's sentiments were heartily approved by all those who know the valuable work that Mr. Colwell has done for the Society and who love him for his exceptional personal qualities as well.

A. FINKL HAS 84th BIRTHDAY

A. Finkl, founder and president of A. Finkl & Sons Co., Chicago, recently celebrated his 84th birthday by appearing at his desk as usual. He started business in Chicago with a bellows, anvil and the necessary small tools over 50 years ago. Today the company ranks high in the forging industry, Mr. Finkl, his three sons and grandson are the owners.

DR. HARDER TELLS NORTHWEST MEMBERS HOW RESEARCH PAYS

Says Research Becomes Practical

By A. C. Forsyth

The annual meeting of the Northwest chapter was held May 16 at the Elks Club in Minneapolis. The meeting began with a dinner and was well attended. The business meeting followed immediately after the dinner, and officers were elected for the coming season.

The chapter was very fortunate in being able to get Dr. O. E. Harder, a former member, to deliver the lecture. Dr. Harder, assistant director of Battelle Memorial Institute, Columbus, discussed "Metallurgical Research and Developments."

The speaker stated that out of 800 large corporations consulted, only 0.25% reported that research did not pay. This shows that research must play a very important part in the business of the world. Dr. Harder then covered these subjects which closely connect theoretical development with industry: Microscope and x-rays; fatigue of metals; properties of high temperatures; induction furnaces; improvement of cast iron by alloy additions; corrosion resistant metals; bearing metals; beryllium-copper alloys, etc.

Many of these subjects were at one time purely research, but now have definite commercial applications.

Dr. Harder closed his lecture by an illustrated review of the important research laboratories in the country.

HEAR TESTING TALK AND INSPECT MILLS

Cleveland Men Go To Lorain For Season's Last Meeting

By H. B. Pulsifer

The Cleveland chapter had its last regular meeting of the 1931-1932 season on May 2 when 150 members and guests went to Lorain to observe steelmaking at the huge plant of National Tube Co.

The afternoon was spent viewing the casting of pig iron, the blowing of the Bessemer, and the white-hot openhearths. The rolling of great ingots to billets and the forming of tubes and rails fascinated everybody. Two of the piercing mills for making seamless tubing were in operation and by themselves warranted making the trip. Of course, numerous executives with badges were on hand to explain things.

At 6:30 dinner was called at the Antlers Hotel, Lorain, where sixty-four remained for an excellent dinner and to hear R. L. Kenyon speak. Mr. Kenyon is supervising research engineer of American Rolling Mill Co., and since he is vice-chairman of the Cincinnati chapter he proved at ease with both the subject and the audience.

His talk was along the line of his present specialty, that is mechanical and physical testing. Pictures of all common and many uncommon testing machines and instruments were projected on the screen and then the action of the test was analyzed. Utility of specific tests and good and weak features of the method or instrument were plainly reviewed.

It was a very profitable evening for anybody at all interested in the art and practice of testing materials. Mr. Kenyon's familiarity with European practice lent an international flavor to the descriptions. Even the learned editor of *Metal Progress* was observed taking notes, presumably for seeding into coming issues of that most decorated of all technical journals.

MARKET DIE-CAST CLAMP HOLDERS

Fisher Scientific Co., Pittsburgh, is marketing laboratory clamp holders made of Castaloy, a white die-cast, nickel-containing alloy much stronger than cast iron holders and no more expensive.

DEARBORN CO. ISSUES LITERATURE

Dearborn Chemical Co., 310 So. Michigan Ave., Chicago, offers descriptive literature on No-Ox-Id Filler Red, a rust preventive which is also a cushion bond for paint coatings. An improved cencentration hydrometer marketed by this company is described in another folder.

WANTED

Used Charpy Impact Testing Machine. Advise condition and price.

Address
P. J. NEELY, 604 Walnut St.
Latrobe, Pa.

SLUSHING COMPOUND USES TOLD HARTFORD

Converse Explains How Rust Action Can Be Stopped

Earl N. Converse, Dearborn Chemical Co., addressed the final technical meeting of the Hartford chapter, May 10, on the subject "Slushing Compounds and Their Use." From a wealth of experience derived from compounding protective coatings for all types of metallic equipment he gave an extremely interesting talk and substituted logical explanations of this subject for the vague mysteries most of us had held.

Sketching briefly the development from early attempts to use waste oils, many of which contained corrosion exciters such as sulphur compounds and even salt, through the use of steam refined cylinder oils, experiments with various animal, mineral, and vegetable oils (the best of which was highly refined petrolatum which would not absorb moisture), finally to arrive at the present goal, the successful use of compounds of chromium which are true rust inhibitors.

It is this rust inhibitive quality of modern compounds which give them their superiority over the oils of various types. A mechanical coating of any kind will give some protection but a good slushing compound must be able to "wet" the surface of the metal, stay as a continuous film and not "lift" as the result of temperature or humidity changes, water proof the surface, it must contain no rust exciters, and be able to inhibit rust formation. No petroleum product alone will form a continuous film on a threaded article unless the groove is completely filled by the compound.

D. A. Nemser, as technical chairman, conducted the discussion. Among the interesting points brought out were: pipe line coatings cost about 2¼ cents per inch of diameter per foot of length; a good physical test for coatings consists in subjecting the coated metal to the moisture conditions of the service it is to have and to measure the electrical conductivity of the metal after different periods of time; the thinnest oil coating is better than paint for a tin roof; sand blasting starts corrosion immediately; sand and carbon are the greatest rust "exciters."

Chairman Henry I. Moore announced plans for the final meeting June 14, which consists of an afternoon outing at the Oasis Club and banquet in the evening. Entertainment is in the hands of W. H. C. Berg, Ralph Cassella, and John P. Howley. J. H. G. Williams is the chairman of the ticket committee.

"SHIELDED ARC" IS CINCINNATI'S TOPIC

Lincoln Explains Process And Results At May 5 Meeting

By N. C. Strohmenger

Cincinnati chapter on May 5 held its annual meeting and election. Reports from various committees active during the year indicated that they had done quite a bit of work. Chairman Salkover extended his sincere thanks to these various committees for their wonderful co-operation during the past year.

Our newly elected chairman, R. L. Kenyon, took the chair and introduced the speaker of the evening, J. C. Lincoln, chairman of the board, Lincoln Electric Co., who spoke on the subject of "The Shielded Arc."

He explained three different methods of welding generally used in industry. We were told of the different kinds of wires used in the past and the more recent developments made on wire that have greatly increased the physical properties so they are almost equal to the parent metal in ductility and greater in tensile strength.

Slides illustrating numerous test specimens broken by tensile, fatigue, and bend testing proved the properties of the welds made by the shielded arc. It was clearly conveyed to us how the shielded arc can be obtained consistently by using special coated wires. Also we were shown quite a number of different types of work that have been welded with the shielded arc by hand and with specially designed machines.

Following this talk, we had a discussion which was greatly beneficial to those present. There was a very good attendance at this meeting.

BUSINESS AND ENTERTAINMENT CONCLUDE BUFFALO'S SEASON

New Officers Address Chapter

By Clyde Llewelyn

The Buffalo chapter's annual dinner was held at the Buffalo Hotel on May 12. Dinner was served to 44 members and their guests.

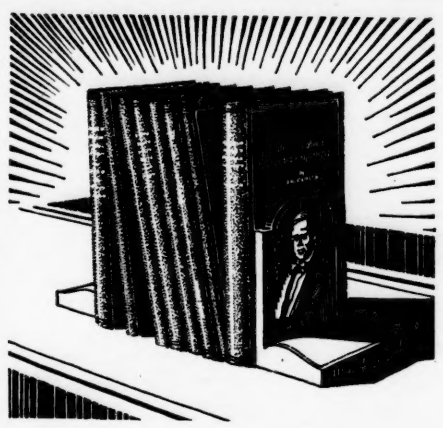
Chairman John H. Birdsong presided. Annual reports of the chapter's activities and standing were read by the secretary and the treasurer. Following this, T. I. Messenger, chairman of the nominating committee, was called upon for the recommendations as to nominees for officers and executives of the Buffalo chapter for the coming year.

The retiring chairman then thanked the members for the support they had given him, etc., after which he introduced the new chairman, J. Robert Eves, who spoke briefly, outlining what the chapter hoped to accomplish during the coming year, stressing the necessity for help and cooperation to make the coming National Metal Congress and Exposition a success, and soliciting the same whole-hearted support of the entire membership as had been given to the retiring chairman. The incoming vice-chairman, secretary and treasurer also gave short talks somewhat along this same line.

After 9:30 P. M. the evening was devoted to the enjoyment of some very fine entertainment, as arranged by Theodore H. Burke, chairman of the entertainment committee, who was very ably assisted by B. L. McCarthy.

INTRODUCE NEW WELDING RODS

Bastian-Blessing Co., 240 East Ontario St., Chicago, has introduced a new line of welding rods and electrodes under the trade name of RegOroD. Scientific research and careful field tests were made during development. The line includes every popular type of rod such as high speed and high test materials.



$1.00 Brings These Books to You

IF this were the only set of the NATIONAL METAL LIBRARY printed, it would cost a fabulous sum. Actually, thousands of sets have been printed and you may buy one for very little. The total cost is only $16.00. **$1.00 brings you the books,** the balance in 5 easy monthly payments of $3.00 each.

The heat treatment and metallurgy of iron and steel, elusive and complex subjects, are clearly explained. Selection of steels, nitriding, quenching, carburizing, inclusions and similar subjects are covered in detail. Valuable production data by eminent authorities is given in each book. The eight books present the whole story.

Lectures on Steel and Its Treatment by **John F. Keller**
A blacksmith who by long and careful study has mastered the mysteries of iron and steel so that he makes them understandable through homely similes and every day comparisons.

Principles of Heat Treatment of Steel by the **Metallurgical Staff, Bureau of Standards**
Presents the basic reasons for the behavior of steels when heated, cooled or quenched. It contains a comprehensive bibliography, a great aid in studying specific problems.

Heat Treatment, Uses and Properties of Steel by **H. B. Knowlton**
Assistant Chief Metallurgist of International Harvester Co. covers the various plain carbon and alloy steels, their selection and properties obtainable by various treatments. The author goes at length into the peculiarities of each steel, methods and equipment for handling, carburizing, heat treating and cleaning.

The Constitution of Steel and Cast Iron by **Frank T. Sisco**
Editor, Alloys of Iron Research, explains in his clear, understandable manner the metallurgical functions of carbon and the common alloying elements, the effects of heat treating and variations in alloy content to secure internal structures that give desired physical properties. Cold working, carburizing and treating of worked and carburized steels are presented at length.

The Quenching of Steels by **H. J. French**
In charge of steel development, The International Nickel Co., clarifies this subject. Cooling mediums are classified. The effect of size and shape of work in process and sources of variation in hardening are presented in detail. Gives a simple means of selecting proper cooling solutions; also tables for determining internal and surface condition of steels after quenching.

Nitriding Symposium, papers presented by several authorities at the Convention of the A.S.S.T., reviews the possibilities of this process, selection of nitriding steels and proper application of the process.

Inclusions in Iron by **Dr. C. R. Wohrman**
Is a careful study of the common inclusions, their nature and effect.

The Application of Science to Industry by **Dr. W. H. Hatfield**
Director, Brown-Firth Research Laboratories, England, is an interesting review of British steel making and rolling practice. He discusses many of the common steels. Chapters on steel at elevated temperatures and tool and cutlery steels contain much valuable data.

The cost is $21.50 if books are purchased separately.
NATIONAL METAL LIBRARY costs only $16.00
***$1.00 Brings You the Books*—The balance in easy monthly payments of $3.00 each. For cash deduct 10%**

To: **The American Society for Steel Treating,**
7016 Euclid Ave., Cleveland, Ohio.
Please send me ..... sets of the NATIONAL METAL LIBRARY, 10 days free examination, postpaid in U.S.A. and Canada.
Please check:
☐ $1.00 enclosed for down payment, balance $3.00 monthly, for next 5 months.
☐ Enclosed is cash in full **(deduct 10% for cash)**
☐ Please bill me and I will remit promptly and in full **(deduct 10% for cash)**
Name .....
Street and No. .....
City ..... State .....

NEW CHAPTER OFFICERS AND EXECUTIVE COMMITTEEMEN

The list below presents chapter officers and executive members for the 1932-1933 season as obtained from records at National Headquarters on June 9. A few of the chapters have not yet announced their officers and committeemen for the coming year.

BALTIMORE CHAPTER

Alex. L. Feild, Alloy Research Corp., chairman; **H. C. Ballord,** Crucible Steel Corp. of America, vice-chairman; **John Borland,** Engineers Club, secretary-treasurer. Executive Committee: **Mark Gathmann, George M. Nauss, William H. Inman, T. R. Matthews, James J. Lacy** and **S. Procter Rodgers.**

BOSTON CHAPTER

E. B. Ashworth, Bethlehem Shipbuilding Corp., chairman; **E. L. Bartholomew,** United Shoe Machinery Corp., vice-chairman; **H. E. Handy,** Saco-Lowell Shops, Biddeford, Me., secretary-treasurer. Executive Committee: **F. P. Flagg, E. N. Downing, G. H. Burnett, W. P. Knecht, Dr. H. H. Lester, A. L. Knight, Dr. J. P. Walsted, R. A. Johnston, L. D. Hawkridge, Dr. G. B. Waterhouse, A. D. Bach** and **Dr. Albert Sauveur.**

BUFFALO CHAPTER

J. Robert Eves, Falls Electric Furnace Co., chairman; **Clyde Llewelyn,** Bliss and Laughlin Co., vice-chairman; **T. H. D. Burke,** Otis Elevator Co., secretary; **Chas. F. Wahl,** Pratt and Letchworth Co., treasurer. Executive Committee: **C. P. Yoder, C. H. Bierbaum, Benedict A. Bovee, George W. Miller** and **N. F. Tisdale.**

CHICAGO CHAPTER

Walter Mathesius, Illinois Steel Co., chairman; **A. W. Sikes,** Western Electric Co., vice-chairman; **J. A. Comstock,** Peoples Gas Light & Coke Co., secretary-treasurer. Executive Committee: **E. C. Blocks, Jr., B. J. Hamerly, L. A. Lindberg, L. H. Whiteside, John Secor, C. H. Stevenson, M. A. Grossmann, R. A. Bull, W. J. MacKenzie** and **E. T. Jackman.**

CINCINNATI CHAPTER

R. L. Kenyon, American Rolling Mill Co., chairman; **E. W. Esslinger,** Union Gas & Electric Co., vice-chairman; **N. C. Strohmenger,** Tool Steel Gear & Pinion Co., secretary-treasurer. Executive Committee: **W. D. Archea, W. J. Love, Voigt Proctor, N. M. Salkover, G. G. Wright** and **Gregory Wright, Jr.**

CLEVELAND CHAPTER

K. R. Van Horn, Aluminum Co. of America, chairman; **E. F. Ross,** Penton Publishing Co., vice-chairman; **H. B. Pulsifer,** Ferry Cap & Set Screw Co., secretary-treasurer. Executive Committee: **W. P. Sykes, H. F. Vichek, W. L. Benninghoff, C. L. Harvey, H. P. Croft, J. S. Ayling, Gordon Williams, C. G. Shontz** and **W. E. Benninghoff.**

COLUMBUS CHAPTER

L. S. Colby, E. F. Houghton & Co., chairman; **G. N. Moffat,** Ohio State University, vice-chairman; **L. H. Marshall,** Grubb & Marshall, secretary; **R. H. Frank,** Bonney-Floyd Co., treasurer. Executive Committee: **J. B. Calhoun, R. E. Christin, O. E. Harder, S. Z. Krumm, J. O. Lord, J. C. Smith, N. W. Stevens** and **W. A. Welcker, Jr.**

DETROIT CHAPTER

C. J. Tobin, General Motors Research Laboratories, chairman; **E. G. Brick,** Cadillac Motor Car Co., vice-chairman. **G. A. Webb,** Pressed Steel Co., secretary-treasurer. Executive Committee: **R. M. Atwater, Glenn Coley, E. F. Collins, E. B. Drake, F. L. Lawrence, H. W. McQuaid, E. O. Mann, J. Harding, L. L. Vasold, J. R. Ross, W. P. Wood, W. Morgenthau, E. W. Upham** and **O. W. McMullan.**

GOLDEN GATE CHAPTER

Howard S. Taylor, Stanford University, chairman; **George A. Nelson,** Shaw Laboratory, vice-chairman; **R. S. Hirst,** 2223 Channing Way, Berkeley, secretary-treasurer. Executive Committee. **Myron Bird, Dr. W. J. Crook, Frank B. Drake, P. S. Williams, Walter Main, Joseph Eastwood, John Grignolo, W. A. Harper, H. L. Hirschler, W. Holzhauer, J. O. Malmquist** and **Leo M. Martin.**

HARTFORD CHAPTER

J. H. G. Williams, Henry Souther Engineering Co., chairman; **Lewis H. Knapp,** Hartford Electric Light Co., vice-chairman; **James Allison,** Union Drawn Steel Co., secretary-treasurer. Executive Committee: **W. H. C. Berg, James N. Skinner, Ralph F. Casella, Irwin F. Holland, Horace W. Staples, W. J. Harrison, F. Casey, Gerald Budge, Edmund S. Gardner, J. H. Coyle, B. S. Lewis, John P. Howley** and **Henry I. Moore.**

INDIANAPOLIS CHAPTER

A. E. Focke, Diamond Chain Co., chairman; **Elam Williams,** J. D. Adams Co., vice-chairman; **R. L. Fitzsimmons,** E. C. Atkins Co., secretary; **Axel Weydell,** 1545 N. Gale St., treasurer. Executive Committee: **E. S. Moore, G. N. Sieger, C. J. Winkler, R. C. Fielding, W. T. Richards, M. G. Spencer** and **H. G. Githens.**

LEHIGH VALLEY CHAPTER

O. V. Greene, Carpenter Steel Co., chairman; **L. F. Witmer,** Lafayette College, vice-chairman; **H. L. Gifford,** Bethlehem Steel Co., secretary-treasurer. Executive Committee: **Norman Greth, C. W. Snadecki, T. G. Foulkes, W. E. Harvey, C. R. Pollack, A. C. Jones, Neil Metcalf, Leon Scheifele** and **J. M. Weil.**

LOS ANGELES CHAPTER

Thos. S. Hutton, Electric Steel & Mfg. Co., chairman; **Edwin H. Kottnauer,** Warman Steel Casting Co., vice-chairman; **Richard S. Smith,** General Metals Corp., secretary-treasurer. Executive Committee: **George Stetter, Victor J. Minner, Silas Kimberly, M. E. Canfield, W. S. Grau, Earle M. Jorgensen, Lee Bergstrom** and **W. A. DeRidder.**

MONTREAL CHAPTER

C. E. Herd, Dominion Engineering Works, chairman; **J. K. Schofield,** Edgar Allen & Co., vice-chairman; **Duncan G. MacInnes,** 4992 Earnscliff Ave., secretary; **Wm. Baxter,** Crane Co., treasurer. Executive Committee: **F. R. Barnsley, W. A. Bradbury, W. J. Brown, C. M. Carmichael, Bernard Collitt, P. H. Desrosiers, E. J. Durkin, F. O. Farey, T. W. Hardy, F. A. McKay, Robert J. Noakes, R. B. Norton, David Robertson, G. W. Scott** and **J. M. Scott.**

NEW HAVEN CHAPTER

S. C. Spalding, American Brass Co., chairman; **M. W. Brewster,** General Electric Co., vice-chairman; **R. T. Porter,** Heppenstall Co., secretary-treasurer. Executive Committee: **B. T. Baker, R. L. Baldwin, G. R. Bunting, Arthur Bliss, P. L. Clark, J. R. Freeman, J. C. Nelson, A. Phillips, M. J. Radecki, Haig Solakian, J. F. Sargent** and **G. S. Watrous, Jr.** Ex-officio members: **F. J. Dawless, H. F. Fish, J. S. Gravely, H. G. Keshian, J. E. Brooks** and **W. E. Chamberlain.**

NEW JERSEY CHAPTER

A. M. McWilliams, McWilliams Forge & Steel Works, chairman; **W. R. Frazer,** Eclipse Aviation Corp., vice-chairman; **John H. Johnson,** Firth-Sterling Steel Co., secretary; **R. W. Thorne,** Colonial Steel Co., treasurer. Executive Committee: **Frank A. Elshoff, James H. Heath, William H. Hall, Joseph A. Doyle, Ernest O. Olds, Edmund L. Roff, Vernon E. Royle, P. C. Osterman, John F. Wyzalek** and **R. J. Allen.**

NEW YORK CHAPTER

E. M. Wise, International Nickel Co., chairman; **A. B. Kinzel,** Union Carbide & Carbon Co., vice-chairman; **T. N. Holden,** E. W. Bliss Co., secretary-treasurer. Executive Committee: **C. E. Meissner, R. M. Kirk, Alexander Gobus, F. T. Sisco, J. S. Vanick, C. D. Barnhart, M. T. Garlinger, H. C. Bostwick, J. R. Dawson, H. M. German** and **Sam Tour.**

NORTH WEST CHAPTER

H. J. Kicherer, Caterpillar Tractor Co., chairman; **H. A. Anderson,** Johnston Mfg. Co., vice-chairman; **Alexis Caswell,** Manufacturers Assoc. of Minneapolis, secretary-treasurer. Executive Committee: **Paul Carpenter, A. C. Forsyth, G. J. Graham, D. E. Hult, K. H. Langguth, A. F. Moyer, Stuart Plumley, R. P. Wassberg** and **T. P. Hughes.**

NOTRE DAME GROUP

Edward Stanton, 1015 Oxford Ave., Eau Claire, Wis., chairman; **George Poredon,** 825 Notre Dame Ave., Notre Dame, Ind., vice-chairman; **John Kelley,** 1215 So. River St., Eau Claire, Wis., secretary; **John Fitzpatrick,** 116 Thomas St., Utica, N. Y., treasurer.

ONTARIO CHAPTER

C. L. Bailey, Wm. Jessop & Sons, Ltd., chairman; **C. H. Mitchell,** Canadian Westinghouse Co., vice-chairman; **L. F. Fitzpatrick,** Flexible Shaft Co., secretary; **A. G. Davis,** Consumers Gas Co., treasurer. Executive Committee: **D. M. Frazer, R. Bradburn, H. Champ, H. F. Davis, O. W. Ellis, W. D. Fairbrother, G. E. Membery, J. W. McBean, R. J. Murray, W. O. Oliver, A. Oram, N. Peterson, R. Potts, J. F. Thomlinson, A. W. Waderlow** and **G. N. Wedlake.**

PHILADELPHIA CHAPTER

Norman L. Mochel, Westinghouse Electric & Mfg. Co., chairman; **Thomas J. Moore,** Columbia Steel & Shafting Co., vice-chairman; **A. O. Schaefer,** Midvale Co., secretary-treasurer. Executive Committee: **H. C. Boynton, Francis B. Foley, John W. Harsch, Edward Hitzeroth, S. B. Mathews** and **Gustaf Peterson.**

PITTSBURGH CHAPTER

S. L. Goodale, University of Pittsburgh, chairman; **N. I. Stotz,** Braeburn Alloy Steel Co., vice-chairman; **H. L. Walker,** Box 521 No. S. Station, secretary-treasurer. Executive Committee: **A. D. Beeken, Jr., H. T. Cousins, J. H. Flaherty, C. H. Herty, Jr., W. I. McInerney, Jerome Strauss** and **E. H. Dix, Jr.**

ROCHESTER CHAPTER

J. L. Reid, Symington Co., chairman; **G. A. Lux,** General Railway Signal Co., vice-chairman; **Irving C. Matthews,** Eastman Kodak Co., secretary-treasurer. Executive Committee: **W. T. Morgan, R. F. Kimber, L. J. Sullivan, J. M. Keating, F. G. Silva** and **W. B. Huntley.**

SCHENECTADY CHAPTER

J. G. Hicks, American Locomotive Co., chairman; **F. C. Kelley,** General Electric Co., vice-chairman; **L. L. Wyman,** General Electric Co., secretary-treasurer. Executive Committee: **C. B. Templeton, W. D. Kellog, W. L. Weaver, R. H. Harrington** and **James Taylor.**

SPRINGFIELD CHAPTER

Thomas P. Jones, Chapman Valve Mfg. Co., chairman. **B. B. Tremere,** Wickwire Spencer Steel Co., vice-chairman. **Earl H. Abbe,** Moore Drop Forging Co., secretary-treasurer. Executive Committee: **T. L. Counihan, A. L. Shields, Vincent T. Malcolm, George W. Morrison, E. A. Basilio, Wynn Rossiter, C. H. Benedict** and **Michael J. Gorman.**

ST. LOUIS CHAPTER

E. H. Meyers, Western Cartridge Co., chairman; **E. Kumming,** Century Electric Co., vice-chairman; **F. Dean Burnett,** Railway Exchange Bldg., secretary-treasurer. Executive Committee: **B. Burgoon, Wm. Horn, O. Moody, Wm. Ruby** and **R. M. Pease.**

TRI-CITY CHAPTER

Garnet Phillips, Franks Foundry Corp., chairman; **R. H. Lind,** Peoples Light Co., vice-chairman; **H. A. Deane,** Deere & Co., secretary-treasurer. Executive Committee: **R. E. McGee, Hyman Bornstein, Capt. J. W. Slattery, G. A. Uhlmeyer, Prof. J. A. Fielding, Fred Turner** and **J. J. Rosen.**

WASHINGTON CHAPTER

L. H. Fawcett, U.S. Naval Gun Factory, chairman; **L. Jordan,** Bureau of Standards, vice-chairman; **S. J. Rosenberg,** Bureau of Standards, secretary-treasurer. Executive Committee: **H. J. Huester, W. H. Swanger, C. E. Margerum, G. L. Yetter, E. C. Groesbeck, C. W. Briggs** and **W. R. Angell.**

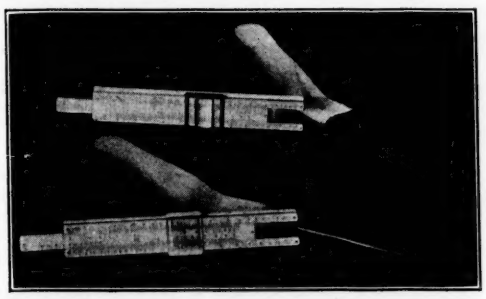
WORCESTER CHAPTER

Milton H. Frommann, Reed & Prince Mfg. Co., chairman; **John A. King,** Box 744, vice-chairman; **Theodore Packard,** American Steel & Wire Co., secretary-treasurer. Executive Committee: **Donald P. Strand, W. J. Long, George Paulson, Rodman R. Tatnall, Levi Wheeler, Melcher G. Werme** and **William Hague.**

YORK CHAPTER

A. W. F. Green, American Chain Co., chairman; **G. E. Shubrooks,** Hamilton Watch Co., vice-chairman; **Chas. M. Strickler,** General Machine Works, secretary-treasurer. Executive Committee: **W. P. Gerhart, H. E. Warren, J. G. Morrison, N. J. Gebert, G. J. O'Neill, F. J. Allen, Wm. Allen, John Bennett** and **Fred Reiners.**

THIS POCKET SLIDE RULE *REALLY* WORKS



This slide rule is indispensable in making frequent calculations in the plant, the laboratory or on the road. It's sturdily built and very accurate. A neat, good grade, leather case easily fits one's vest pocket—available for instant use.

The rule is 5 inches long and has square, tangent, sine and logarithm scales in addition to the usual scales for multiplying and dividing. The divisions are ruled with extreme accuracy. Built of plied bamboo held rigidly by an aluminum frame, the rule will not warp or gather dampness in normal use The slide is a sturdy metal frame protecting a solidly mounted glass. A magnifier available at slight additional cost, aids materially. . . . The price is only $2.50 for the rule and leather case; with magnifier, $3.00.

You can have the rule for 10 days free examination.

ORDER BLANK

To: AMERICAN SOCIETY FOR STEEL TREATING, 7016 Euclid Ave., Cleveland, Ohio

Please send me_____pocket slide rules for 10 days free examination.

_____rules *without* magnifier at $2.50 each.

_____rules *with* magnifier at $3.00 each.

( ) Cash enclosed. ( ) Please render invoice and I will pay promptly

Name_____

Street and No._____

City_____ State_____

DRIVER-HARRIS LICENCED

Driver-Harris Co. has been licensed by International Nickel Co. to melt and fabricate the corrosion resisting alloy, Ni-Resist, which contains approximately 14% nickel, 6% copper and 2% chromium, balance cast iron. Inasmuch as it is resistant to moderately high temperatures it is supplementary to Nichrome and other high temperature alloys made by Driver-Harris Co.

Ni-Resist resembles cast iron in production and application but is resistant to growth, scaling and warpage.

BROWN OFFERS NEW POTENTIOMETER

A new indicating potentionmeter of the self-balancing type is the latest addition to the potentiometer line of Brown Instrument Co., Philadelphia. This is an important advance in potentiometer design since most indicating potentiometers hitherto have required hand balancing. Aside from this main design feature, the new Brown indicating potentiometer offers many other outstanding advantages.

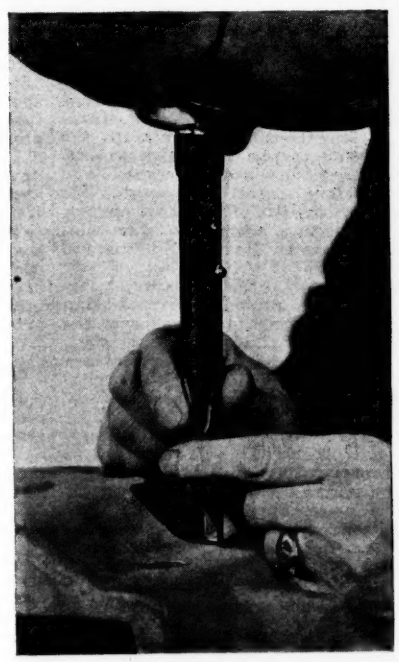
AM. CYANAMID NAMES DISTRIBUTOR

American Cyanamid Co., New York, has appointed Case Hardening Service Co., 2281 Scranton Rd., Cleveland, as exclusive distributors in Northern Ohio of their Aerocase process materials.

OFFER SALT-SPRAY TEST FOLDER

Bulletin 1506 of American Instrument Co., 774 Girard St., N. W., Washington, D. C., describes the new Aminco salt-spray corrosion test chamber. The bulletin also gives the methods used by the U. S. Navy in making such tests.

Focussing Pocket Microscope



This new type vest pocket microscope has three powers—80X, 100X and 120X—and is focusing!

Accurately ground lenses and the exclusive micrometer focussing feature make this microscope an asset in the laboratory and shop.

Its very low price, $7.00, places it in reach of all.

ORDER BLANK

To: The Ripley Company, 2900 Meadowbrook Blvd., Cleveland, Ohio.

Please send postpaid,_____hand microscope(s) for which $7.00 each is enclosed.

Please send me,_____hand microscopes by mail, C.O.D.

Money refunded if microscope is not satisfactory

Name_____

Street and No._____

City_____ State_____